Grade 8

meap™
Michigan Educational Assessment Program

Item Descriptors

5th

8th

SCIENCE
FALL 2010

MICHIGAN STATE BOARD OF EDUCATION

STATEMENT OF ASSURANCE OF COMPLIANCE WITH FEDERAL LAW

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NOTE: For each item listed throughout this booklet, the first statement is the Michigan Science Curriculum Framework (MSCF) benchmark and the second statement is the descriptor for the item's stem or question. Note that some items only occur in certain forms as indicated by the form numbers in parenthesis after the item numbers (i.e., F1=Form 1, F2=Form 2, etc.).

Students were instructed to read the directions below silently as the test administrator read them aloud.

PART 1

DIRECTIONS:

In this part, you will answer multiple-choice science questions. Some questions will ask you to read a passage, table, or other science-related information. Use that information with what you know to answer the question.

You must mark all of your answers in Part 1 of your **Answer Document** with a No. 2 pencil. You may underline, highlight, or write in this test booklet to help you, but nothing in this test booklet will be scored. No additional paper may be used.

Mark only one answer for each question. Completely fill in the corresponding circle on your **Answer Document**. If you erase an answer, be sure to erase completely. Remember that if you skip a question in the test booklet, you need to skip the answer space for that question on the **Answer Document**. If you are not sure of an answer, mark your **best** choice.

A sample question is provided for you below.

Sample Multiple-Choice Question:

Pill bugs can often be found underneath rocks and rotting logs. When exposed to light, they immediately try to find a dark place to hide. This reaction by the pill bugs is a result of

A migration.

B feeding behavior.

C energy requirements.

D changing environmental conditions.

For this sample question, the correct answer is **D**. Circle **D** is filled in for the sample question on your **Answer Document**.

Once you have reached the word **STOP** in your test booklet, do **NOT** go on to the next page. If you finish early, you may go back and check your work in Part 1 of the test **ONLY**. Check to make sure that you have answered every question. Do **NOT** look at any other part of the test.

NOTE: The directions for Part 2 are the same as the above instructions.

1 **L.OL.05.41** Identify the general purpose of selected animal systems (digestive, circulatory, respiratory, skeletal, muscular, nervous, excretory, and reproductive).

Given four pairs of animal body systems, recognize the pair which serves a specified purpose for a familiar animal.

A a pair where one system is not directly involved with the specified process

B a pair where one system is not directly involved with the specified process

C correct, the pair of body systems where both are directly involved with the specified process.

D a pair where neither system is directly involved with the specified system

2 **(F1, F7) L.EC.06.31** Identify the living (biotic) and nonliving (abiotic) components of a ecosystem.

Given ten separate ecosystem components, arranged in four sets of three components each, recognize the set of three components that are abiotic.

A one component in the set is biotic

B two components in the set are biotic

C correct, the set of components where all three are abiotic

D two components in the set are biotic

2 **(F2, F3, F4, F5, F6) L.EC.06.22** Explain how two populations of organisms can be mutually beneficial and how that can lead to interdependency.

Recognize the type of relationship where two separate species coexist in a specified cooperative relationship.

A wrong type of relationship

B wrong type of relationship

C correct, the type of relationship indicating cooperation

D wrong type of relationship

3 **L.OL.07.63** Describe evidence that plants make, use, and store food.

Given a familiar edible plant, recognize the part of this plant that primarily stores its specified energy resource.

A correct, the plant part that primarily stores the energy resource

B a part of the plant that could store a bit of the energy resource but not provide for most of the storage

C the part of a plant where some energy is allocated for offspring

D a part of the plant that does not store the energy resource

4 **L.EV.05.11** Explain how behavioral characteristics (adaptation, instinct, learning, habit) of animals help them survive in their environment.

Among a list of four characteristics for a specified animal type, recognize which of the characteristics is a behavioral adaptation for survival.

A growth characteristic found in the animal type

B correct, behavioral characteristic that is a survival adaptation

C body characteristic that serves many types of behavior

D body characteristic that changes in regard to threat and not stemming from the animal's behavior

5 **L.OL.07.21** Recognize that all organisms are composed of cells (single-cell organisms, multicellular organisms).

Given what appears to be a lifelike object found in a meteorite, recognize what would support the conclusion that the object was once biotic.

A a test that does not confirm the object was once biotic

B a test that does not confirm the object was once biotic

C correct, the test that would provide evidence that the object was once biotic

D a test that does not indicate the object was once biotic

6 **L.EV.05.14** Analyze the relationship of environmental change and catastrophic events (for example: volcanic eruption, floods, asteroid impacts, tsunami) to species extinction.

Given a specified, permanent biotic change to a geographic-based ecosystem, recognize the most likely impact from the biotic change on the ecosystem's animal population.

A an incorrect concept implying the animals would adapt to the change via Lamarckian evolution

B correct, the most likely change in animal population levels and available species types

C an incorrect concept where the biotic change would have no effect on the animal populations

D a true point about the new environment but unlikely to facilitate animal adaptation or survival

7 **(F1, F4, F7) L.HE.05.12** Distinguish between inherited and acquired traits.

Recognized whether and how a specified and familiar human trait is acquired or inherited.

A wrong means for the trait occurrence in the offspring

B correct, the means by which the trait appears in the offspring

C non human method by which trait appearance occurs

D source of trait appearance that does not happen through human reproduction

7 (F2) L.HE.07.21 Compare how characteristics of living things are passed through generations, both asexually and sexually.

For a specified multi-cellular organism that reproduces asexually, recognize the statement that best describes the genetics of the offspring.

A correct, describes the genetic composition of the offspring

B incorrectly describes the genetic composition of the offspring

C incorrectly describes the genetic composition of the offspring

D incorrectly describes the genetic composition of the offspring

7 (F3, F6) L.HE.07.22 Compare and contrast the advantages and disadvantages of sexual vs asexual reproduction.

Recognize a disadvantage of asexual reproduction compared to sexual reproduction.

A a fact that can be true for both asexual and asexual reproduction

B correct, the disadvantage of asexual compared to asexual reproduction

C a sexual reproduction fact that can not be compared to asexual reproduction processes

D a fact that could be true for both asexual and asexual reproduction

7 (F5) L.HE.07.21 Compare how the characteristics of living things are passed on through generations, both asexually and sexually.

Given a table which describes how four different organisms reproduce, recognize a list of organisms that can reproduce asexually.

A a pair of organisms, only one of which can reproduce asexually

B a pair of organisms, only one of which can reproduce asexually

C correct, three organisms all of which can reproduce asexually

D three organisms, only two of which can reproduce asexually

8 S.IA.07.13 Communicate and defend findings and observations.

Based on specified findings from a naturalistic observation investigation, recognize the best, source for support of the specified finding.

A evidence which does not address the setting of the investigation or the findings

B a source of authority that confirms the actual finding is the expected finding based on outside information

C correct, a graph displaying the investigation data (e.g. observation counts) across various treatment conditions

D other general sources of information regarding the investigation, however, these general sources do not necessarily confirm the findings

9 (F1, F4, F7) S.IP.07.15 Identify patterns in data.

Recognize the line graph that accurately displays the pattern in a table of data.

A graph which displays the opposite pattern presented in the data table

B correct, graph which accurately displays the pattern in the data table

C graph which inaccurately displays the pattern in the data table

D graph which inverts the pattern in the data table

9 (F2, F5) S.IP.07.13 Use tools and equipment (spring scales, stop watches, meter sticks and tape, models, hand lens, thermometer, sieves, microscopes, hot plates, pH meters) appropriate for scientific investigations.

Given five tools or resources, recognize the best combination of four tools and resources to carry out the specified scientific investigation.

A incorrect combination of tools and resources

B correct, the combination of tools and resources that would be used to perform the investigation

C incorrect combination of tools and resources

D incorrect combination of tools and resources

9 (F3, F6) S.IP.07.11 Generate scientific questions based on observations, investigations, and research.

Recognize the scientific question that can be studied using scientific processes and the resources available in a school lab.

A a question about a fact, the question is not empirical

B a question about how to use a lab tool, the question is about a lab process not a scientific investigation

C a theoretical question that would be answered via compilation of many relevant empirical studies

D correct, the research question that can be studied using investigative process and school lab resources.

10 S.RS.07.14 Evaluate scientific explanations based on current evidence and scientific principals

Given four measures of physical characteristics for each of four unknown solids determine which pair of the solids are the same substance.

A the wrong pair of solids as the same substance, based on a characteristic that is not unique for a specific substance

B the wrong pair of solids as the same substance, based on a characteristic that is not unique for a specific substance

C correct, the pair of solids that have the same characteristic value that is unique for a given substance

D the wrong pair of solids, based on a characteristic value that can be true for any pair of substances

11 **P.PM.07.23** Illustrate the structure of molecules using models or drawings (water, carbon dioxide, salt).

Given four molecular drawings, with element atoms labeled, recognize the drawing that represents a familiar and specified molecule.

A incorrect drawing

B incorrect drawing

C incorrect drawing

D correct, the specified molecular drawing

12 **(F1, F2, F5, F6) P.PM.07.22** Describe how the elements within the Periodic Table are organized by similar properties into families (highly reactive metals, less reactive metals, highly reactive nonmetals, and some almost completely non-reactive gases).

Given a description of elements, recognize where the elements are presented in the Periodic Table.

A a location that incorrectly splits the group elements across the Periodic Table

B correct, the described elements form a family

C a location that incorrectly splits the group elements across the Periodic Table

D a location that incorrectly splits the group elements across the Periodic Table

12 **(F3, F4, F7) P.PM.07.21** Identify the smallest component that makes up an element.

Recognize the smallest unit that maintains the properties of an element.

A correct, the appropriate unit

B unit composed of more than one element

C unit that could contain more than one element

D a description of any mass

13 **P.PM.07.24** List examples of physical and chemical properties of elements and compounds (boiling point, density, color, conductivity, reactivity).

Recognize the difference in a physical property of the same compound in different states of matter based on a described observation.

A correct, recognizes the property and the difference between states of matter of the compound

B incorrectly recognizes the amount of the compound as a physical property

C incorrectly recognizes the amount of the compound as a physical property

D incorrectly attributes the observation to a rate of change in state of matter for the compound

14 P.CM.07.21 Identify evidence of chemical change through color, gas formation, solid formation, and temperature change.

Given four different scientific observations, recognize which is the best evidence for a chemical change.

A correct, confirms that a chemical change occurred

B does not necessarily distinguish a physical change from a chemical change

C a physical change

D neither a physical change or a chemical change

15 (F1, F5) P.EN.06.41 Explain how different forms of energy can be transferred from one place to another by radiation, conduction, or convection.

Given four different scientific observations, recognize which observation represents conduction.

A correct, the observation is conduction

B observation is convection

C observation is convection

D observation is radiation

5(F2, F4, F6) P.EN.07.33 Demonstrate how waves transfer energy when they interact with matter (for example: tuning fork in water, wave hitting a beach, earthquake knocking over buildings).

Recognize the best statement that describes how waves, associated with a specific natural event, bring about a physical change in matter.

A correct, description how the waves bring abut physical change in matter

B incorrect description how the waves produce an energy field

C incorrect description how the waves produce an energy field

D incorrect description how the waves produce energy to bring about physical changes

15 (F3, F7) P.EN.07.43 Explain how light energy is transferred to chemical energy through the process of photosynthesis.

Given four compounds of the photosynthetic chemical equation, recognize the two compounds that are the reactants.

A a pair of compounds where only one is a reactant

B a pair of compounds where only one is a reactant

C correct, the pair of compounds that are the reactants

D a pair of compound where neither are the reactants

16 **P.CM.06.12** Explain how mass is conserved as it changes from state to state in a closed system.

Given information regarding a lab exercise where a large amount of observed solid mass has become a small amount of observed solid mass due to a change in a closed system, select the best reason to explain how the total mass within the closed system remains the same before and after the change.

A incorrect reason for the mass remaining constant

B incorrect reason for the mass remaining constant

C incorrect reason for the mass remaining constant

D correct, the reason the total mass remain the same, though the solid mass decreased

17 **S.RS.07.16** Design solutions to problems using technology.

Given a specified and familiar technological task, recognize the best Internet inquiry phrase useful to obtain helpful information to complete the task.

A an inquiry phrase that does not address the objective of the task

B an inquiry phrase that does not address the objective of the task

C correct, the inquiry phrase that would provide information most helpful for task completion

D an inquiry phrase that is to general and off focus from the specified task

18 **S.IP.07.16** Identify patterns in data.

Given four visually-displayed temperature maps and a temperature key, recognize the statement that most accurately summarizes temperature change over time and direction of movement.

A statement recognizes the amount of temperature changes but not the direction of temperature movement

B correct, statement recognizes the amount of temperature changes and the direction of temperature movement

C statement misinterprets the amount of temperature change

D statement misinterprets the amount of temperature change and misinterprets the direction of the change

19 **E.SE.06.62** Explain how a compass works using the magnetic fields of the Earth, and how a compass is used for navigation on land and sea.

Recognize how a compass needle works.

A selects a statement that the compass points to a land location

B selects a statement that the compass points to a land location

C selects the wrong magnetic location

D correct, identifies the correct magnetic location

20 (F1, F3, F5, F7) E.SE.06.52
Demonstrate how major geological events (earthquakes, volcanic eruptions, mountain building) result from (tectonic) plate motion.

Given four diagrams of how tectonic plates move above the asthenosphere, select the diagram that indicates the plate movement that forms a specified Earth feature.

A an incorrect diagram of plate movement for the specified Earth feature formation

B an incorrect diagram of plate movement for the specified Earth feature formation

C correct, the diagram by which plate movement forms the specified Earth feature

D an incorrect diagram of plate movement for the specified Earth feature formation

20 (F2, F4, F6) E.SE.06.12 Explain how waves, wind, water, and glacial movement shape and reshape the land surface of Earth by eroding rock in some areas and depositing sediments in other areas.

Recognize the best Earth-surface, energy-producing process by which Earth materials, from a far location (hundreds of miles), were relocated to another location.

A an Earth-surface, energy-producing process that can only move Earth material below the specified mass scale and only for a smaller distance range.

B an Earth-surface, energy-producing process that can only move Earth material below the specified mass scale and only for a smaller distance range.

C correct, an Earth-surface, energy-producing process that can move Earth material at the specified scale mass and for the specified distance range.

D an Earth-surface, energy-producing process that can move Earth material at the specified mass scale but only for a smaller distance range.

21 **E.SE.06.41** Compare and contrast the formation of rock types (igneous, metamorphic, and sedimentary) and demonstrate the similarities and differences using the rock cycle model.

Identify two processes involved in the formation of a specified type of rock.

A correct, the two processes involved in the formation of the specified type of rock

B two processes that do not contribute to formation of the specified type of rock

C two process where one process does not contribute to formation of the specified type of rock

D two processes that do not contribute to formation of the specified type of rock

22 **E.SE.06.11** Explain how physical and chemical process weathering lead to erosion and the formation of soils and sediments.

Recognize the similarity in both the physical and chemical breakdown of rock.

A a condition that is not necessary for the physical breakdown of rock

B a condition that is not true for the physical breakdown of rock

C correct, the similarity from both the physical and chemical breakdown of rock

D a condition that is not true for the physical breakdown of rock

23 **E.ES.07.74** Describe weather conditions associated with frontal boundaries (cold, warm, stationary, and occluded) and the movement of major air masses and the jet stream across North America using a weather map.

Using a conventional weather graphic, identify the type of front passing over Michigan.

A a front not represented by the graphic

B an incorrect type of front

C a front not represented by the graphic

D correct, the front represented by the graphic

24 **E.ES.05.61** Demonstrate, using a model, seasons as the result of variations in the intensity of sunlight caused by tilt of the axis, and revolution around the Sun.

Recognize the reason why Michigan's average daily temperatures differ between two specified seasons of the year.

A correct, the reason for the difference in temperature between the two seasons

B a reason that is unrelated to a source of Earth's heat

C a reason that does not consider Earth's position in orbit

D a reason that is unrelated to a source of Earth's heat

25 (F1, F4, F5, F6) E.ES.07.13 Describe how the warming of Earth by the Sun produces winds and ocean currents.

Given four statements, recognize the statement which best explains the occurrence of atmospheric convection currents.

A an incorrect reason associating convection currents with condensation of water

B an incorrect reason associating convection currents with sinking of higher energy molecules

C an incorrect reason associating convection current with denser atmosphere materials rising

D correct, the reason that indicates how applied energy causes convection currents

25 (F2, F3, F7) E.ES.05.62 Explain how the revolution of Earth around the Sun defines a year.

Recognize which pair of statements correctly reports the time needed for Earth to rotate and revolve.

A pair includes a statement that incorrectly reports the time needed to rotate

B pair includes a statement that incorrectly reports the time needed to revolve

C correct, pair of statements of time needed to rotate and revolve

D pair of statements that incorrectly report the time needed to rotate and revolve

26 S.RS.07.16 Design solutions to problems using technology.

Recognize a disadvantage of a specified technology application among the advantages of the technology application.

A an advantage

B correct, the disadvantage

C an advantage

D an advantage

27 S.IP.07.12 Design and conduct scientific investigations.

Given a partial list of information for a scientific experiment, recognize the step (i.e., part) of the scientific process presented by the information.

A a step of the scientific process not presented by the information

B a step of the scientific process not presented by the information

C correct, the step of the scientific process presented by the information

D a step of the scientific process not presented by the information

28 **S.IP.07.13** Use tools and equipment (spring scales, stop watches, meter sticks and tapes, models, hand lens, thermometer, sieves, microscopes, hot plates, pH meters) appropriate to scientific investigations.

Among four scientific tools, recognize the tool most useful for obtaining a specified measure of a solid.

A a tool that does not directly determine the specified measure; this tool would only be useful with other characteristic knowledge about the substance of a regular-formed solid

B a tool that does not provide the specified measure of a solid

C a tool that does not provide the specified measure of a solid

D correct, that tool for obtaining the specified measure of a solid

29 **S.IA.07.15** Use multiple sources of information to evaluate strengths and weaknesses of claims, arguments, or data.

Given a specified scientific task, review the list of four information references about the task to recognize the most helpful reference.

A selects as a reference a source of information used to sell the product being studied, a potentially biased, non-impartial reference

B selects as a reference an article about the material being studied that does not provide information about the task's objective

C correct, selects as a reference objective scientific information about the material being studied from a credible, impartial source

D selects as a reference opinions from a non-scientific survey about an off-topic quality of the material being studied

30 **S.RS.07.15** Demonstrate scientific concepts through various illustrations, performances, models, exhibits, and activities.

Given four illustrations, recognize the best illustration that presents a specified, familiar science concept.

A illustration does not accurately represent the concept

B correct, illustration accurately represents the concept

C illustration does not accurately represent the concept

D illustration does not accurately represent the concept

31 **E.ES.07.82** Analyze the flow of water between the components of a watershed, including surface features (lakes, streams, rivers, wetlands) and groundwater.

Recognize the scientific label of water that soaks into the ground after precipitation.

A correct, the label for the specified description of the water

B the incorrect label for the specified description of the water

C the incorrect label for the specified description of the water

D the incorrect label for the specified description of the water

32 **E.FE.07.12** Compare and contrast the composition of the atmosphere at different elevations.

Given four descriptions of change in atmospheric conditions, recognize the change that most likely occurs as location changes at a specified Earth surface feature.

A correct, the most likely change in atmospheric conditions as location changes at the specified Earth surface feature

B incorrectly selects the change in atmospheric conditions as location changes at the specified Earth surface feature

C incorrectly selects the change in atmospheric conditions as location changes at the specified Earth surface feature

D incorrectly selects the change in atmospheric conditions as location changes at the specified Earth surface feature

33 (F1, F6) E.ES.07.72 Describe how different weather occurs due to the constant motion of the atmosphere from the energy of the Sun reaching the surface of the Earth.

Given four reasons, recognize which reason explains a difference in atmospheric conditions at two distinct locations on the Earth.

A reason does not explain the difference in atmospheric conditions at the 2 Earth locations

B correct, reason accounts for the difference in the atmospheric conditions at the 2 Earth locations

C reason does not explain the difference in atmospheric conditions at the 2 Earth locations

D reason does not explain the difference in atmospheric conditions at the 2 Earth locations

33 (F2, F7) E.ES.07.73 Explain how the temperature of the oceans affects the different climates on Earth because water in the oceans holds a large amount of heat.

Recognize the description that best indicates how the prevailing winter temperatures of a specified Earth surface area differ from the prevailing winter temperatures of other land areas at the same or lower latitudes.

A description which attributes the temperature to a difference in longer days between the two areas

B description which attributes the temperature to a difference in the amount of direct sunlight between the two areas

C description which attributes the warmer temperatures of one area to a screening of arctic air from the south

D correct, a description that attributes the temperature to a difference due to water surrounding the warmer area

33 (F3) E.ES.07.81 Explain the water cycle and describe how evaporation, transpiration, condensation, cloud formation, precipitation, infiltration, surface runoff, ground water, and absorption occur within the cycle.

Given a landscape illustration with some components of the water cycle labeled, recognize the component that would be most disrupted by a specified change to the landscape.

A correct, the component of the water cycle most disrupted by the specified landscape change

B a component of the water cycle that would not be obviously disrupted

C a component of the water cycle that would be reduced but not disrupted

D a component of the water cycle that would not be obviously disrupted

33 (F4, F5) E.ES.07.11 Demonstrate, using a model or drawing, the relationship between the warming by the Sun of Earth and the water cycle as it applies to the atmosphere (evaporation, water vapor, warm air rising, cooling, condensation, clouds).

Given a scenario by which applied energy will increase lake water temperature over time, recognize the corresponding effect on the lake.

A correct, the effect of the energy applied to the lake water

B an opposite effect that the applied energy has on the atmosphere above the lake

C an opposite effect that the applied energy will have on the water in the lake

D a weather effect that does not correspond to the application of the energy to the lake

34 E.ST.05.11 Describe a model that describes the position and relationship of the planets and other objects (comets and asteroid) to the Sun.

Given an illustration of the solar system, including the Sun and planets, recognize the location of another specified component of the solar system.

A incorrect location for the specified solar system component

B correct, the location for the specified solar system component

C incorrect location for the specified solar system component

D incorrect location for the specified solar system component

35 (F1, F4) E.ST.05.25 Explain the tides of the ocean as they relate to the gravitational pull and orbit of the moon.

Among a list of four statements, recognize the statement that explains tidal movement.

A statement incorrectly attributes tidal movement to an atmospheric force

B statement incorrectly attributes tidal movement to rapid changes in Earth's surface

C statement incorrectly attributes tidal movement to temperature variation

D correct, statement attributes tidal movement to gravitational pull outside of Earth

35 (F2, F3, F6) E.ST.05.22 Explain moon phases, as they relate to the position of the moon in its orbit around the Earth, result in the amount of observable reflected light.

Given a layout of Earth, the Sun and four possible moon locations, recognize the lunar-phase picture when the moon is at one specified location among the four possible locations.

A an incorrect picture of the lunar phase

B correct, the picture of the lunar phase when the moon is at the specified location given the location of Earth and direction of the Sun's rays

C an incorrect picture of the lunar phase

D an incorrect picture of the lunar phase

35 (F5, F7) E.ST.05.23 Recognize that nighttime objects (stars and constellations) and the Sun appear to move because the Earth rotates on its axis and orbits the Sun.

Recognize the direction the Sun appears to move as a person observes the Sun from a fixed location on Earth between two specified seasons.

A incorrect direction for the apparent motion

B incorrect direction for the apparent motion

C incorrect direction for the apparent motion

D correct, the direction for the apparent motion

36 **E.ST.05.21** Describe the motion of planets and moons in terms of rotation on axis and orbits due to gravity.

Based on the specified scenario about another possible planet in the Solar System, recognize the best description regarding gravitation force between the Sun and this "new" planet.

A statement that is incorrect due to the new planets location

B correct, statement how gravitation force can vary between the new planet and the Sun

C statement that is incorrect indicating gravitational force does not by change though relative distance changes

D statement that incorrectly indicates how gravitational force changes in respect to distance change

37 **(F1, F5) E.ST.06.42** Describe how fossils provide important evidence of how life and environmental conditions have changed.

Among a list of four factual statements, recognize the statement of fact that best supports the conclusion that Michigan's environment has changed over time.

A correct, factual statement about Michigan's past environment

B factual statement about an environmental impact that does not apply to Michigan

C factual statement about early Michigan anthropology that not provide evidence of an environmental change

D factual statement about early Michigan anthropology that not provide evidence of an environmental change

37 (F2, F6) E.ST.05.24 Explain lunar and solar eclipses based on the relative positions of Earth, the moon, and the Sun, and the orbit of the moon.

Given illustrations of both a solar and a lunar eclipse which include Earth, the moon, and the Sun, recognize the statement that describes a total solar eclipse.

A correct, statement that has the correct position for the moon and correctly indicates that total solar eclipse occurs during daylight hours

B statement that has an incorrect position for the moon though correctly indicates the total solar eclipse occurs during daylight hours

C statement that has the correct position for the moon though incorrectly indicates the total solar eclipse occurs during nighttime hours

D statement that has an incorrect position for the moon and incorrectly indicates the total solar eclipse occurs during nighttime hours

37 (F3, F4, F7) E.ST.06.31 Explain how rocks and fossils are used to understand the age and geological history of Earth (timelines and relative dating, rock layers).

Recognize the data and information resource that geologists obtain from a specified form of Earth's crust.

A selects an ability to predict a geological event that is not provided by the specified form of Earth's crust

B selects an ability to model Earth's surface though these data are not provided by the specified form of the Earth's crust

C correct, selects the type of data and information provided by the specified form of the Earth's crust

D selects a chemistry and physics lab analysis procedure that is not unique to the specified form of Earth's crust

38 (F1, F2, F3, F4, F5) S.IA.07.11 Analyze information from data tables and graphs to answer scientific questions.

Given a graph that represents change in speed over time, recognize the time during which a vehicle maintains a specified motion.

A time duration during which the vehicle does not maintain the specified motion

B correct, time duration during which the vehicle maintains the specified motion

C time duration during which the vehicle does not maintain the specified motion

D time duration during which the vehicle does not maintain the specified motion

38 (F6, F7) S.IA.07.11 Analyze information from data tables and graphs to answer scientific questions.

Given three graphs that illustrate the percentage and type of surface water within total fresh water and the percent of fresh water within Earth's total water, recognize the statement that is correct based on the information presented in the graphs.

A statement of fact using information not provided by the graphs

B statement that over represents the percentage of a water type in a location with respect to all of Earth's water

C statement that presents the opposite information in one of the graphs

D correct, statement characterizes the state of matter of Earth's surface water

39 P.FM.05.21 Distinguish between contact and non-contact forces.

Given seven events of force on an object arranged into four separate pairs of events, recognize the pair that exhibits force from a contact and a non-contact source.

A a pair where both exhibit non-contact force

B correct, the pair that includes a contact and non-contact force

C a pair where both exhibit contact force

D a pair where both exhibit contact force

40 (F1, F6, F7) P.FM.05.31 Describe what happens when two forces act on an object in the same or opposing directions.

Given an illustrated and specified description of how an object is applying a force to another object, recognize the net force between the two objects in this specific situation.

A an incorrect concept about the net force between the two objects

B an incorrect concept about the net force between the two objects

C an incorrect concept about the net force between the two objects

D the correct concept about the net force between the two objects

40 (F2) P.FM.05.34 Relate the size of change in motion to the strength of unbalanced forces and the mass of the object.

Given a specified scenario regarding two objects of different mass, moving at the same speed, recognize the best statement to describe the force needed to stop the objects within the specified distance.

A incorrect statement about the relationship between speed and stopping force

B incorrect statement about the relationship between type of road surface and stopping force

C incorrect statement about the relationship between mass difference and stopping force

D the correct statement about the relationship between mass difference and stopping force

40 (F3) P.FM.05.32 Describe how constant motion is the result of balanced (zero net) forces.

Given a scenario with a graph about an object moving at a constant speed, recognize the conditions of force on the object for it to move a constant speed.

A statement indicates the object moves at a constant speed via non-zero net forces

B statement indicates the object moves at a constant speed via non-zero net forces

C statement indicates the object moves at a constant speed via non-zero net forces

D correct, indicates an object moves at a constant speed due to zero net forces

40 (F4, F5) P.FM.05.33 Describe how changes in the motion of objects are caused by a non-zero net (unbalanced) force.

Given a scenario and illustration of a man juggling four balls, recognize the forces acting on a specified ball.

A statement indicates the net force is opposite the actual force on the specified ball

B correct, statement indicates the direction of the net force on the specified ball

C statement indicates the specified juggled ball is motionless

D statement about net force that would have the specific juggled ball drift independent of any constant force

41 **P.FM.05.42** Describe the motion of objects in terms of distance, time, and direction, as the object moves, and in relationship to other objects.

Given a scenario of two objects in motion for given speeds and directions from a specified reference point illustrated on a map, recognize the best factual statement regarding the objects' locations after a specified amount of time.

A statement in which the relative locations and speeds of the objects are incorrect

B correct, the statement where the relative locations and speeds of the objects are correct

C statement in which the relative locations are correct however the relative speeds of the objects are incorrect

D statement in which the relative locations are incorrect however the relative speeds of the objects are correct

42 **P.EN.07.61** Identify that nuclear reactions take place in the Sun, producing heat and light.

Given four reactions, recognize the type of reaction by which the Sun produces heat and light.

A incorrect reaction description

B incorrect change in matter description

C correct, the type of reaction that produces heat and light in the Sun

D incorrect chemical process description

43 **(F1, F5) P.EN.06.12** Demonstrate the transformation between potential and kinetic energy in simple mechanical systems (for example: roller coasters, pendulums).

Given an illustration of a marble moving on the surface of an upright curved track, recognize the statement that best describes the energy of the moving marble at labeled distinct points along the curved track.

A statement that does not appropriately identify the marble's types of energy at specified points on the track

B statement that does not appropriately quantify the marble's type of energy at specified points on the track

C correct, statement that appropriately identifies the marble's types of energy at specified points on the track

D statement that does not appropriately quantify the marble's type of energy at specified points on the track

43 (F2, F6) P.EN.07.32 Describe how waves are produced by vibrations in matter.

Recognize the statement that describes how mechanical waves transfer energy in matter

A correct, the statement regarding the transfer of mechanical wave energy

B statement that does not describe how mechanical waves transfer energy

C statement that does not describe how mechanical waves transfer energy

D statement that does not describe how mechanical waves transfer energy

43 (F3, F4, F7) P.EN.06.11 Identify kinetic or potential energy in everyday situations (for example: stretch rubber band, objects in motion, ball on a hill, food energy).

Recognize the correct description of energy change in an object as it moves form a high to low elevation.

A correct, the change in energy type as the object decreases its elevation

B incorrect change; from an energy form to type of energy

C incorrect change in energy type; opposite the correct change

D incorrect change specification; from an energy type to an energy form

44 P.EN.07.31 Identify examples of waves, including sound waves, seismic waves, and waves on water.

Given four events that affect the Earth's surface, recognize the event that involves seismic waves.

A correct, Earth crust event that involves seismic waves

B an Earth surface event that does not involve seismic waves

C an Earth surface event that does not involve seismic waves

D an Earth surface event that does not involve seismic waves

45 (F1, F4, F7) P.CM.07.23 Describe the physical properties and chemical properties of the products and reactants in a chemical change.

Given a description of a combustion lab exercise, recognize the concluding statement that best describes the specified reactant and product.

A correct, conclusion describes the reactant and product

B conclusion mischaracterizes the reactant and product

C conclusion mischaracterizes the combustion process

D conclusion mischaracterizes the combustion process

45 (F2, F5) P.CM.06.11 Describe and illustrate changes in state in terms of the arrangement and relative motion of the atoms or molecules.

Describe the molecular activity of a liquid as energy is applied to the liquid.

A description correctly indicates the activity of the molecules but incorrectly states the space among the molecules

B correct, description correctly indicates the activity of the molecule and correctly states the space among the molecules

C description incorrectly indicates the activity of the molecules and incorrectly states the space among the molecules

D description incorrectly indicates the activity of the molecules but correctly states the space among the molecules

45 (F3, F6) P.CM.07.22 Compare and contrast the chemical properties of a new substance with the original after a chemical change.

Recognize the statement that best compares a chemical product to its chemical reactants.

A statement that incorrectly describes the properties of the reactants and product

B correct, the statement that correctly describes the properties of the reactants and product

C statement that incorrectly describes the elements of the reactants and product

D statement that incorrectly describes the state of matter of the reactants and product

46 **S.IA.07.11** Analyze information from tables and graphs to answer scientific questions.

Given a two-line graph based on a specified scenario about a fish and its parasite, interpret the graph and select the best conclusion based on the scenario and the graphed results.

A conclusion does not agree with the information provided in the graph

B correct, conclusion shows the relationship between the fish population levels and the control parasite population level

C conclusion is contrary to the resulting parasite population level as the fish population increases without parasite control

D conclusion is contrary to the information displayed in the graph

47 **S.RS.07.11** Evaluate the strengths and weakness of claims, arguments, and data.

Given an observation task and corresponding observation data in a table, recognize which of the four statements provided best evaluates the data.

A statement implies the data are sufficient as basis for a conclusion

B correct, statement recognizes that more data are needed as basis for a conclusion

C statement implies the data are sufficient as basis for a conclusion

D statement implies the data are sufficient as basis for a conclusion

48 **L.EV.05.21** Relate degree of similarity in anatomical features to the classification of contemporary organisms.

Given four separate statements regarding applicable scientific methods, recognize the statement that provides the most reasonable basis for studying evolutionary relationships among different organisms.

A statement implies study of existing conditions, not changing conditions

B statement regards each specific organism's life characteristics

C correct, statement recognizes comparison among organisms and their anatomic features

D statement regards each specific organism's life characteristics

49 **(F1, F4) L.EC.06.21** Describe common patterns of relationships between and among populations (competition, parasitism, symbiosis, predatory/prey).

Given four statements regarding relationships between different species, recognize the statement that best describes the specified relationship.

A statement describes a relationship different from the specified relationship

B statement describes a relationship different from the specified relationship

C statement describes a relationship different from the specified relationship

D correct, statement describes the specified relationship

49 (F2, F3, F5) L.EC.06.41 Describe how human beings are part of the ecosystem of Earth and that human activity can purposefully, or accidently, alter the balance in ecosystems.

Recognize the form of human activity or technology that could disrupt the specified life processes of a familiar organism in its habitat.

A correct, the technology that disrupts the specified organism's life processes

B technology that could impact the organism but does not impact the specified life process

C human activity that could impact the organism but does not impact the specified life process

D human activity that would benefit the organism

49 (F6, F7) L.EC.06.21 Describe the patterns of relationships between and among populations (competitive, parasitism, symbiosis, predatory/prey).

Recognize the statement that best describes a relationship between the white-tailed deer and the gray wolf.

A correct, the relationship between the gray wolf and the white tailed deer

B the opposite relationship between the gray wolf and white-tailed deer

C a statement that incorrectly classifies the white-tailed deer

D statement that incorrectly describes the relationship between the white-tailed deer and the gray wolf

50 L.HE.05.11 Explain that the traits of an individual are influenced by both the environment and the genetics of the individual.

Given a specified plant that has a flower of a set color, recognize the statement that best describes how the flower of the plant exhibits this color.

A correct, describes the transfer process of flower color from parent to offspring

B incorrect statement regarding the means by which the flower exhibits its set color

C incorrect statement regarding the process by which the parent transfers flower color to its offspring

D incorrect statement regarding the means by which the flower exhibits its set color

51 L.EC.06.42 Predict possible consequences of overpopulation of organisms, including humans, (for example: species extinction, resource depletion, climate change, pollution).

Recognize the most likely consequence due to a rapid increase of a specified population in a relatively closed ecosystem.

A a consequence unlikely to happen and not related to the effects due to a population increase

B a consequence that is the opposite of what would happen

C a consequence based on erroneous reason for the consequence

D correct, the consequence noting the change resulting from the increase in the specified population

52 (F1) L.OL.05.42 Explain how animal systems (digestive, circulatory, respiratory, skeletal, muscular, nervous, excretory, and reproductive) work together to perform selected activities.

Given four statements how two specified body systems work together, recognize the statement that best describes the interaction between the two body systems after a specified body activity.

A correct, describes the interaction of the two specified body systems

B does not indicate the purpose of one of the two body systems

C does not indicate the purpose of one of the two body systems

D does not indicate the purpose of one of the two body systems

52 (F2) L.OL.07.24 Recognize that cells function in a similar way in all organisms.

Given four cell types combined into pairs, recognize the pair of primary cell types that provide a specified animal function across four familiar animals

A correct, the pair of cell types that enable the animals' similar function

B a pair of cell types where only one type is primary for the specified function

C a pair of cell types where only one type is primary for the specified function

D a pair of cell types where neither type is primary for the specified function

52 (F3, F5, F6) L.OL.07.61 Recognize the need for light to provide energy for the production of carbohydrates, proteins, and fats.

Recognize the reason less plant growth occurs in a specified environmental condition.

A correct, the resource that plants need is absent in the specified environmental condition

B a reason that would not affect plant growth

C a reason that would not affect plant growth

D a reason that would not affect plant growth

52 (F4) L.OL.06.52 Distinguish between the ways in which consumers and decomposers obtain energy.

Identify the group of organisms that obtains energy solely from a specified resource.

A correct, the group of organisms that solely obtain their energy from the specified resource

B a group of organisms that does not obtain its energy from the specified resource

C a group of organisms that does not obtain its energy from the specified resource

D a group of organisms that does not obtain its energy from the specified resource

52 (F7) L.OL.06.51 Classify organisms (producers, consumers, and decomposers) based on their source of energy for growth and development.

Given a specified familiar animal, classify the organism based on its source of energy.

A incorrect type of classification and incorrect concept of its role in a food chain

B incorrect type of classification though correctly recognizes its sources for energy

C correct type of classification and correct sources for energy

D incorrect type of classification and incorrect concept of its role in a food chain

53 L.EC.06.23 Predict how changes in one population might affect other populations based on their relationships in the food web.

Given a food web having six separate organisms, indicate how a decrease in the population of one specified organism most likely affects other organisms in the web.

A correct, recognizes the change in other organism populations due to the decrease in the specified population

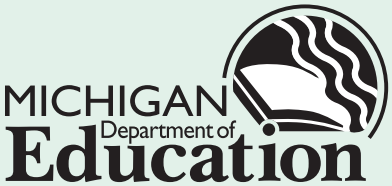
B selects changes in organism populations that would not be affected by the specified population change

C selects changes in organism populations that would not be affected by the specified population change

D selects a change opposite of the change most likely to happen do to the decrease in the specified population

5th

8th



Office of Educational Assessment and Accountability (OEAA)
Michigan Educational Assessment Program (MEAP)
Phone: 1-877-560-8378
Website: www.michigan.gov/meap
Email: oeaa@michigan.gov